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SOLAR OBSERVATIONS.

SOLAR AND SKY RADIATION MEASUREMENTS DURING MARCH, 1921.

By HERBERT H. KIMBALL, Meteorologist.

[Solar Radiation Investigations Section, Washington, Apr. 28, 1921.]

For a description of instruments and exposures, and an account of the methods of obtaining and reducing the measurements, the reader is referred to this REVIEW for April, 1920, 48: 225.

From Table 1 it is seen that the solar radiation intensities measured very close to normal for March at all the stations.

At Lincoln, a marked diminution in solar radiation intensities after noon of the 31st is due to a change in the wind direction which brought smoke from the city over the station at the University farm 2½ miles away.

Table 2 shows an excess in the radiation received from the sun and sky at Washington, a decided deficiency at Madison, and close to the normal amount at Lincoln.

Skylight polarization measurements obtained on eight days at Madison give a mean of 69 per cent and a maximum of 72 per cent on the 17th. At Washington, skylight polarization measurements obtained on four days give a mean of 54 per cent and a maximum of 64 per cent on the 18th. The Madison values are above the averages for March, and the Washington values are slightly below the average. After the 18th the polarimeter at Washington was undergoing repairs, and no observations were obtained until the first of the next month.

TABLE 1.—*Solar radiation intensities during March, 1921.*

[Gram-calories per minute per square centimeter of normal surface.]

Washington, D. C.

Date.	Sun's zenith distance. 8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon.
	75th meridian time.	Air mass. A. M.					P. M.				Local mean solar solar time.
	e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Mar. 1	5.16				0.96		0.96				4.57
10	2.87				1.32		1.16	0.87	0.75	0.61	2.74
11	4.57	0.78	0.92	1.06	1.22				0.91		3.30
14	7.29			0.71	0.91						8.18
16	9.14						1.07	0.80	0.65	0.63	10.97
18	3.99		0.92	1.04	1.27	1.44	1.27				3.00
23	3.45		0.81	0.95	1.10	1.29					4.17
25	9.14					1.38	1.10	0.90	0.76		10.59
29	1.78			1.05	1.28	1.45	1.06	0.80	0.66	0.57	1.96
Means		(0.78)	0.88	0.96	1.15	1.39	1.10	0.84	0.75	0.60	
Departures		+0.07	+0.06	+0.00	−0.01	−0.03	−0.03	−0.09	−0.05	−0.10	
Madison, Wis.											
Mar. 2	4.95			1.15	1.32	1.52					4.75
3	1.68					1.53	1.36	1.22			1.37
9	2.36						1.35				1.68
16	1.78				1.31	1.52					2.87
17	4.57				1.20		1.09	0.83			5.36
28	1.19					1.60	1.35	1.21	1.06	0.93	1.32
29	2.06					1.46	1.18				2.74
30	3.63				1.13						4.95
Means				(1.15)	1.24	1.53	1.27	1.09	(1.06)	(0.93)	
Departures				−0.05	−0.09		−0.06	+0.02	−0.01		
Lincoln, Nebr.											
Mar. 3	3.00			1.06	1.35	1.51	1.29	1.09	0.95	0.86	2.87
9	1.78					1.56	1.24	1.09	0.97	0.80	4.17
10	3.30			1.02	1.22	1.45					3.63
11	3.00							0.94	0.79	0.63	3.45
16	2.74				1.28						8.81
22	2.36			1.10	1.29	1.51	1.21	1.04	0.87	0.72	2.87
25	5.36				1.27	1.52					3.63
28	1.68					1.45	1.22	1.02	0.86	0.75	3.99
29	3.00				1.26	1.52					3.45
31	2.74		0.91	1.10	1.31	1.55	1.19	0.93	0.78	0.64	3.30
Means			(0.91)	1.07	1.28	1.51	1.23	1.02	0.87	0.73	
Departures			−0.01	−0.02	−0.02		−0.03	−0.06	−0.06	−0.05	

TABLE 1.—*Solar radiation intensities during March, 1921*—Continued.

Santa Fe, N. Mex.

Date.	Sun's zenith distance. 8 a.m.	78.7°	75.7°	70.7°	60.0°	0.0°	60.0°	70.7°	75.7°	78.7°	Noon.
	75th meridian time.	Air mass. A. M.					P. M.				Local mean solar solar time.
	e.	5.0	4.0	3.0	2.0	*1.0	2.0	3.0	4.0	5.0	e.
	mm.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*mm.*
Mar. 16	3.00			1.36	1.51	1.67	1.45	1.31	1.18	1.09	1.78
17	2.49		1.25	1.37	1.50	1.73	1.52	1.36	1.20	1.08	2.49
23	3.63			1.16	1.40	1.64	1.47	1.31	1.20	1.08	1.96
24	2.26			1.27	1.37	1.59					2.36
Means			(1.25)	1.29	1.44	1.66	1.48	1.33	1.19	1.08	
Departures			+0.04	−0.02	−0.01	+0.05	+0.07	+0.06	+0.07	+0.03	

TABLE 2.—*Solar and sky radiation received on a horizontal surface.*

Week beginning.	Average daily radiation. Washington.	Madison.	Lincoln.	Average daily departure for the week. Washington.	Madison.	Lincoln.	Excess or deficiency since first of year. Washington.	Madison.	Lincoln.
	cal.	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*	*cal.*
Feb. 26	285	216	369	− 6	− 69	+22	−450	−2,407	−1,041
Mar. 5	326	217	372	+12	− 95	− 1	−365	−3,171	−1,048
12	408	216	318	+69	−117	−81	+120	−3,393	−1,617
19	364	271	417	+ 6	− 81	+ 2	+165	−4,459	−1,605
25	441	389	472	+66	+ 19	+71	+629	−4,324	−1,251

* Extrapolated.

MEASUREMENTS OF THE SOLAR CONSTANT OF RADIATION AT CALAMA, CHILE, FEBRUARY, 1921.

By C. G. ABBOT, Assistant Secretary.

[Smithsonian Institution, Washington, May 2, 1921.]

In continuation of preceding publications, I give in the following table the results obtained at Montezuma, near Calama, Chile, in February, 1921, for the solar constant of radiation. The reader is referred to this REVIEW for February, August, and September, 1919: 47, for statements of the arrangement and meaning of the table.

The unusually small number of observations reported for January and February were due to the unprecedentedly cloudy weather of these months. In a telegram, it is reported that the weather of March was more favorable.

Date.	Solar constant.	Method.	Grade.	Transmission coefficient at 0.5 microns.	Humidity. p/p s.c.	Humidity. V. P.	Humidity. Rel. hum.	Remarks.
1921.							*Per cent.*	
P. M.	*cal.*					*cm.*		
Feb. 11	1.962	$M_{1.04}$	S−	0.857	0.506	0.34	13	Cirri scattered about sky.
	1.953	$M_{1.02}$						
	1.956	W. M.						
A. M.								
12	1.947	$M_{1.13}$	S−	.857	.583	.55	28	Cirri scattered over north and east.
P. M.								
21	1.960	$M_{1.05}$	S−	.856	.504	.60	22	Clouds scattered about sky.
	1.958	$M_{1.07}$						
	1.959	W. M.						
A. M.								
24	1.942	$M_{1.70}$	S..	.855	.487	.57	32	Cirri in east preventing earlier observations.
	1.950	$M_{1.29}$						
	1.946	W. M.						
25	1.960	$M_{1.04}$	S..	.857	.557	.71	26	Cumuli over high peaks.
	1.961	$M_{1.03}$						
	1.960	W. M.						
26	1.960	$M_{1.42}$	S..	.855	.494	.69	41	Few clouds low in east.
	1.951	$M_{1.32}$						
	1.955	W. M.						
28	1.971	$M_{1.10}$	S−	.859	.636	.71	39	Clouds over western and eastern horizon.
	1.973	$M_{1.07}$						
	1.972	W. M.						